

REMARKS

This is responsive to the Office Action issued on September 2, 2005. By this response, claims 1, 3, 4, 8 and 18 are amended. Claims 19 and 20 are newly presented. No new matter is added. Claims 1-20 are now active for examination. A petition for a one-month extension of time is submitted concurrently herewith.

The Office Action

The Office Action rejected claims 1-9, 11 and 14-18 under 35 U.S.C. §102(b) as being anticipated by Ishiyama (US Patent No. 5,632,351). Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ishiyama in view of Grundle et al. (US Publication No. 2004/0164625). Claim 12 stood rejected under 35 U.S.C. §103(a) as being unpatentable over Ishiyama in view of Kim et al. (US Publication No. 2001/0054730). The Office Action rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Ishiyama in view of Jackson et al. (US Patent No. 2,942,165).

Applicants respectfully submit that the rejections are overcome in view of the amendments and/or remarks presented herein.

The Anticipation Rejection of Claims 1-9, 11 and 14-18 Is Overcome

Claims 1-9, 11 and 14-18 were rejected as being anticipated by Ishiyama. The anticipation rejection is respectfully overcome because Ishiyama cannot support a prima facie case of anticipation.

Claim 1, as amended, describes a power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, and includes a plurality of

coolers. Each of the coolers extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft, and has a cooling surface defined by a direction parallel to the output shaft and the radial direction. A power semiconductor module is mounted on the cooling surface of at least one of the plurality of coolers. Exemplary implementations of a power converter as described in claim 1 ~~is~~ are illustrated in Figs. 3A and 17, and related descriptions in the written description.

However, Ishiyama does not meet every limitation described in claim 1. Ishiyama's power converter includes a single piece of power sink 20 for dissipating heat generated by semiconductor devices 21, 23 mounted on the surface of the power sink 20. The single power sink 20 encloses a plurality of cooling fins 47. Each of the cooling fins 47 is disposed parallel to an output shaft 13. See Fig. 8 of Ishiyama.

As shown in Fig. 8, each of the cooling fins 47 extends in a direction substantially tangential to the shaft 13, not along a radial direction relative to shaft 13, as described in claim 1. Furthermore, each cooling fins 47 only has a cooling surface substantially parallel to the shaft 13, ~~and does not have a~~ The cooling surface of each cooling fans 47 is not that is defined by both a direction parallel to the output shaft and the radial direction, as described in claim 1. Moreover, according to Ishiyama, the semiconductor devices 21, 23 ~~that generate heat are~~ mounted to the heat sink 20 enclosing all the cooling fins 47. None of the semiconductor devices 21, 23 actually ~~attached~~ attaches to the cooling surface of any of the cooling fins 47. Thus, the semiconductor devices 21, 23 of Ishiyama do not meet the limitation of claim 1, which requires that the semiconductor devices be mounted to a cooling surface of at least one of the coolers defined by a direction parallel to the output shaft and the radial direction. Accordingly, Ishiyama fails to disclose "a plurality of coolers each of which extends along a radial direction

with respect to an output shaft so as to be perpendicular to the output shaft and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor,” as required by claim 1.

Since Ishiyama fails to teach every limitation of claim 1, Ishiyama cannot support a prima facie case of anticipation. The anticipation rejection of claim 1 is untenable and should be withdrawn. Favorable reconsideration of claim 1 is respectfully requested.

Claims 2-9, 11 and 14-17, directly or indirectly, depend on claim 1 and incorporate every limitation thereof. Therefore, claims 2-9, 11 and 14-17 are patentable over Ishiyama by virtue of their dependencies on claim 1. Favorable reconsideration of claim 2-9, 11 and 14-17 is respectfully requested.

Claim 18 describes a method ~~for cooling of arranging a cooler and a power semiconductor module in~~ for cooling a power converter. A plurality of coolers are provided. Each of the coolers extends along a radial direction with respect to an output shaft of a motor formed in series with the converter so as to be perpendicular to the output shaft, and has a cooling surface defined by a direction parallel to the output shaft and the radial direction. A power semiconductor module is mounted on the cooling surface of at least one of the coolers. As discussed earlier relative to claim 1, Ishiyama fails to disclose these features. Consequently, for at least the same reasons as for claim 1, claim 18 is patentable over Ishiyama. Favorable reconsideration of claim 18 is respectfully requested.

The Obviousness Rejections Are Overcome

Claims 10, 12 and 13, directly or indirectly, depend on claim 1, and were rejected mainly based on Ishiyama, and further in view of Grundle, Kim or Jackson. The obviousness rejections are respectfully overcome because the cited references, either alone or in combination, cannot support a prima facie case of obviousness.

As discussed earlier, claim 1 is patentable over Ishiyama. Grundle, Kim and Jackson were cited by the Office Action for their purported disclosures of an annular coolant passage, a capacitor having a trapezoidal cross-sectional shape, and the spatial arrangement of the semiconductor devices. However, Grundle, Kim and Jackson, either combined or alone, do not alleviate the deficiencies of Ishiyama. Accordingly, Ishiyama, even if combined with any of either one Grundle, Kim and Jackson, still fails to disclose every limitation of claim 1, all the features of which are incorporated into claims 10, 12 and 13 by virtue of their dependencies from claim 1. Therefore, claims 10, 12 and 13 are patentable. Favorable reconsideration of claims 10, 12 and 13 is respectfully requested.

New Claims 19 and 20 Are Patentable

New claims 19 and 20, directly or indirectly, depend on claim 1 and incorporate every limitation thereof. As discussed earlier, claim 1 is patentable over the documents of record. Thus, claims 19 and 20 also are patentable by virtue of their dependencies from claim 1, as well as based on their own merits. Favorable consideration of claims 19 and 20 is respectfully requested.

CONCLUSION

For the reasons given above, Applicants believe that this application is in condition for allowance and Applicants request that the Examiner give the application favorable consideration and permit it to issue as a patent. However, if the Examiner believes that the application can be put in even better condition for allowance, the Examiner is invited to contact Applicants' representatives listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to **Deposit Account 500417** and please credit any excess fees to such deposit account.

Respectfully submitted,

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